

Safeguarding shellfish from 'micro-invasive' species



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WDFW Shellfish and Seaweed Health and Biosecurity



Shellfish

Important components of marine ecosystems

- Habitat
- Prey
- Filtration, nutrient cycling
- Other ecosystem services

Biodiversity

- 3,000+ marine invertebrate species in Salish Sea

Conservation concerns

- Endangered pinto abalone, Olympia oysters, *Pycnopodia* seastars



Washington's valuable shellfish

State & tribal wildstock harvest

- \$130 million annual state commercial harvest³
- Comparable tribal harvest, 20 tribes
- 226,000+ recreational licenses³
- Private shellfish resources*



Shellfish aquaculture¹

- >\$90m revenue¹; \$150m sales²
- >\$184m activity
- 2700+ jobs

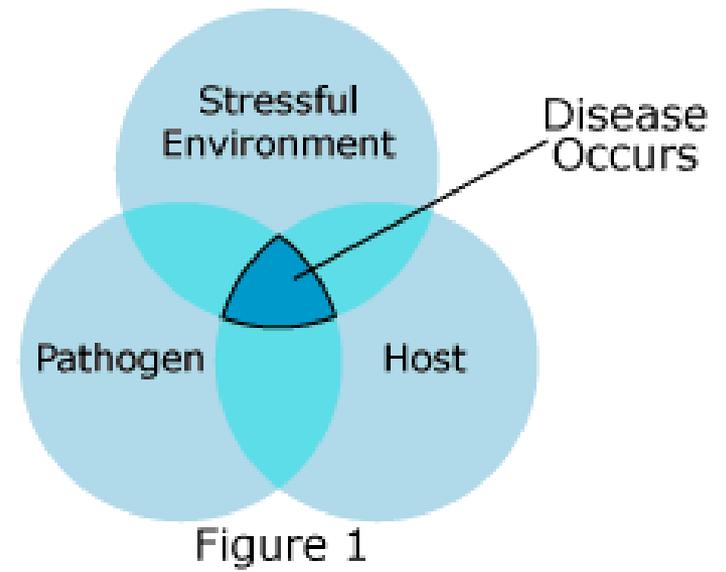


Cultural significance

- Harvested by tribes for millennia
- Continued importance to tribal and non-tribal, commercial and non-commercial harvesters



Shellfish & disease



Introductions Resulting from Shellfish Movements

Examples of species imported into WA waters historically:

- Eastern oysters - **MSX and dermo, Eastern drills**
- Pacific oysters from Japan – **Japanese drills**
- European flat oysters - **Bonamia**
- Red abalone – **Potential introduction of withering foot syndrome**



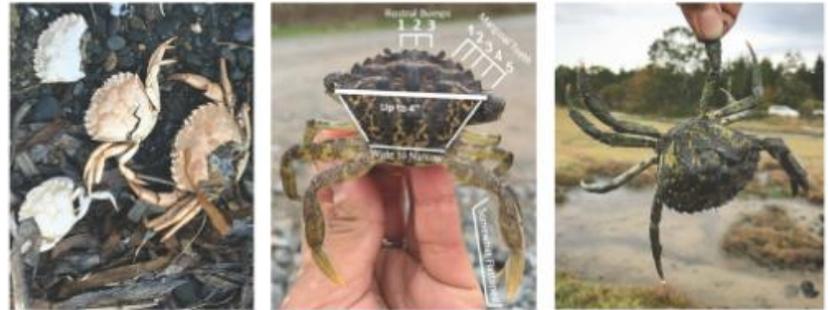


RISKS + IMPACTS

Invasive pests

REPORT INVASIVE EUROPEAN GREEN CRAB

European green crabs may be present in this area



If you find a suspected European green crab or their shell, please photograph it, note the location, and report to the Washington Department of Fish and Wildlife:

wdfw.wa.gov/greencrab

Or contact us at:

Phone: 1-888-WDFW-AIS

Email: ais@dfw.wa.gov



https://wdfw.wa.gov/sites/default/files/2022-06/European_green_crab_reporting_sign_2022.jpg



Invasive pests



C. Eardley, WDFW

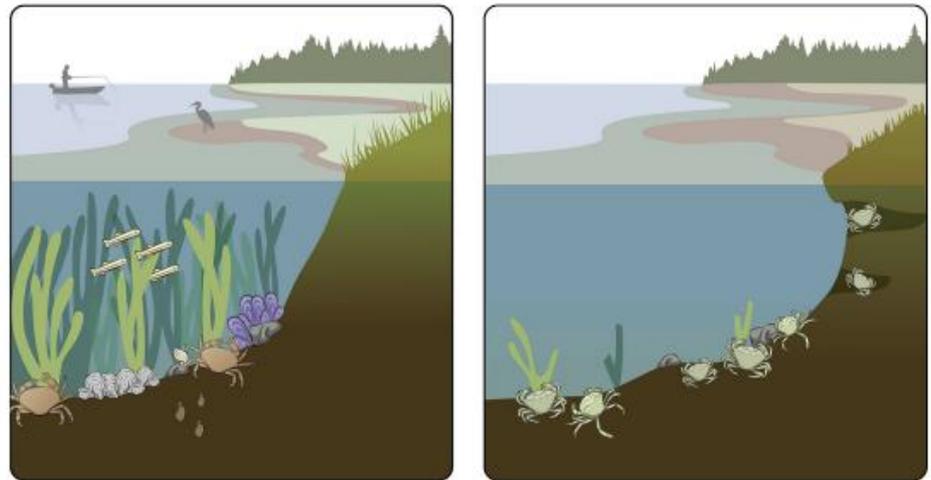


C. Speck,, WDFW



Impacts of invasive pests

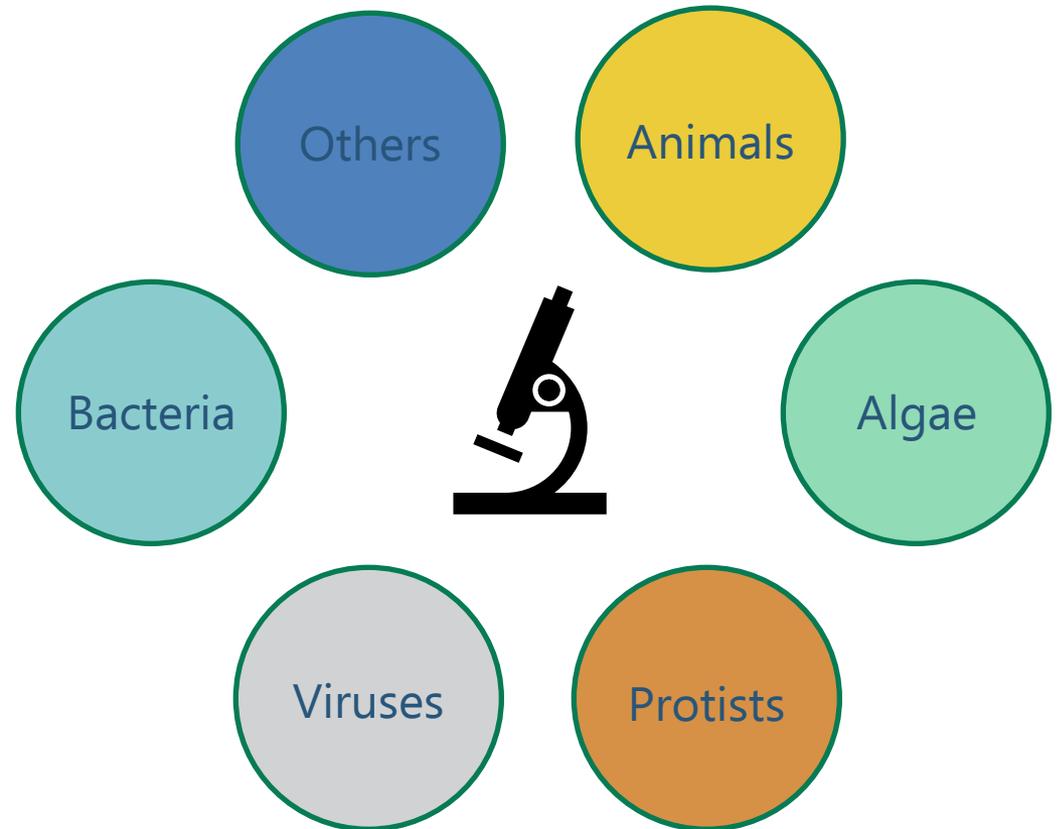
- Kill or harm wild and cultivated shellfish
- Outcompete native species
- Change coastal habitats
- Spread disease



K. Hourihan for WA Sea Grant



Micro-invaders



Unsafe shellfish

DANGER 

TOXIC SHELLFISH
DO NOT EAT clams, oysters, mussels, or scallops.






Shellfish in this area are unsafe to eat due to biotoxins.

위험! 치명적인 독성 조개류. 먹지 마십시오! Korea
 Nguy Hiểm! Nghêu sò bị nhiễm độc. Đừng ăn! Vietnam
 ប្រោះថ្នាំ! សូមកុំទទួលបានសត្វទាសត្រូវខ្យងខ្យាជៀសវាងដែលមានជាតិពុលដោយសារតែ Cambodia
 ¡Peligro! Mariscos tóxicos. ¡No comer! Spain
 Опасно! Ядовитые моллюски. Не употреблять в пищу! Russia
 ផ្ទុះគ្រោះថ្នាក់! សត្វទាសដែលជាប់ជាមួយប៊ីតុកស៊ីន។ កុំប្រើប្រាស់! Laos
 危險！有毒的貝類。切勿食用！ China

Always check the shellfish safety hotline:
1-800-562-5632 or
www.doh.wa.gov/shellfishsafety.htm
 For more information, contact:

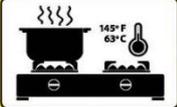


360-236-3330

VIBRIO BACTERIA
WARNING 

Eating raw shellfish from this beach can make you SICK.

Cook all shellfish to 145°F (63°C) for 15 seconds to kill *Vibrio* bacteria.

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Always check the shellfish safety website:
www.doh.wa.gov/ShellfishSafety
 For more information, contact:



360-236-3330

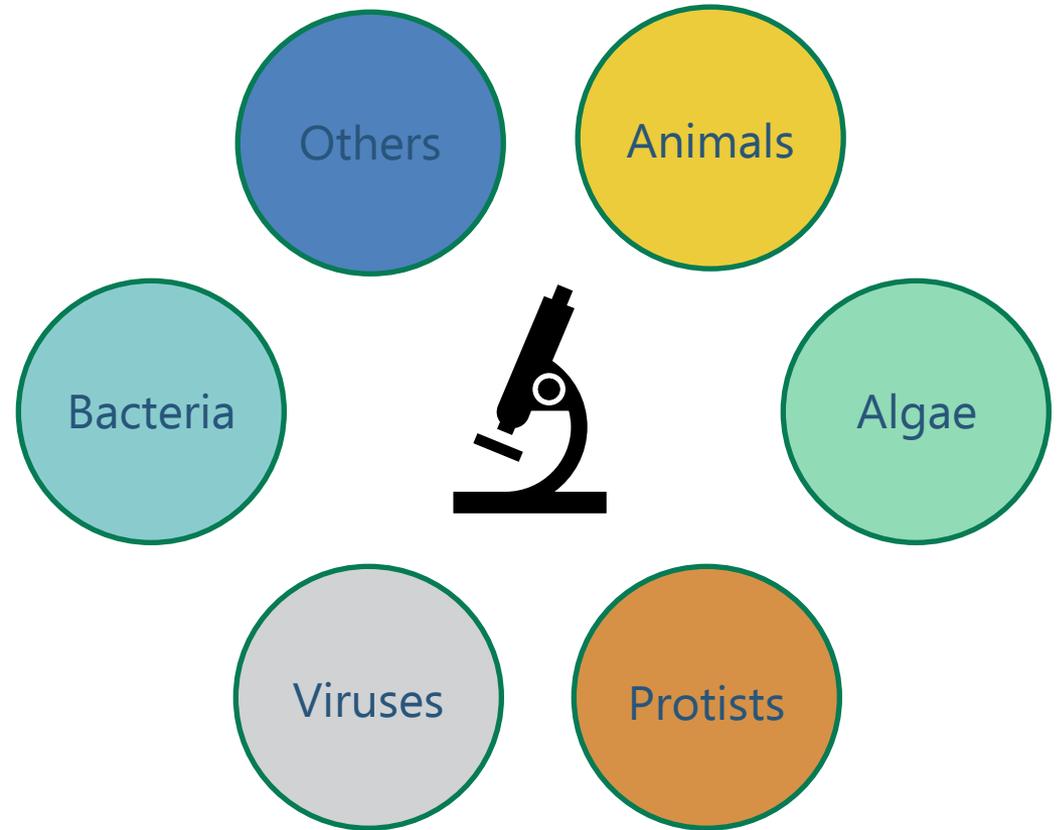
Check before you DIG!




Micro-invaders

Parasites and diseases
that harm shellfish

NOT human beings
“Not zoonotic”

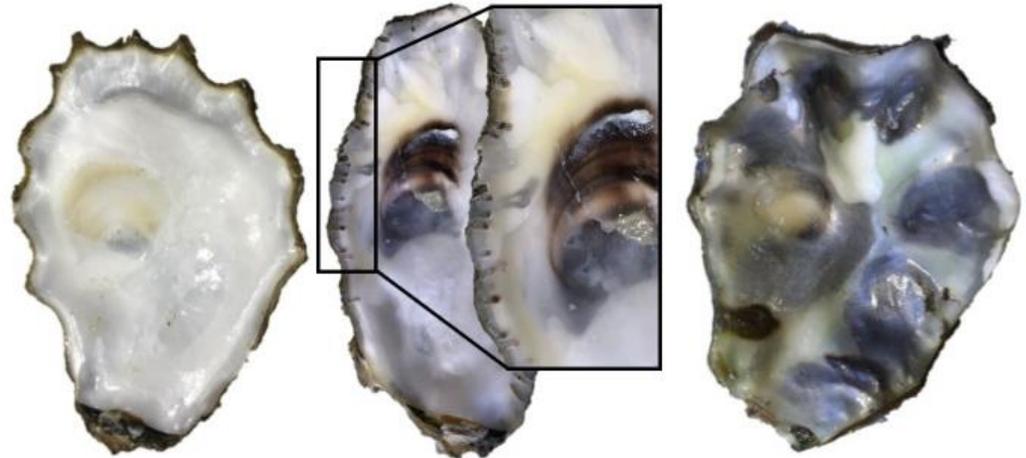


Types of harmful micro-invaders

Animals



Blister Worm (*Polydora* spp.)

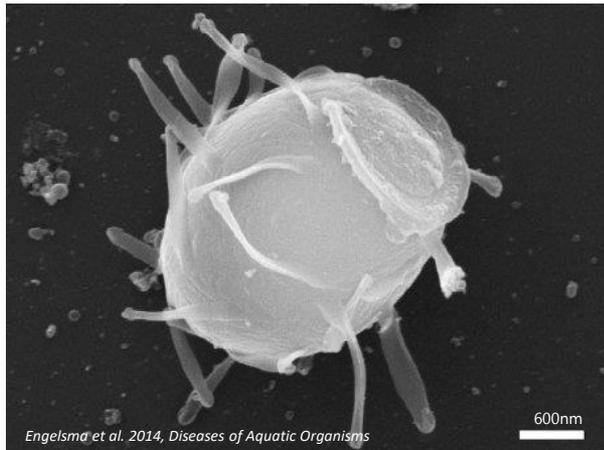


J. Martinelli, University of Washington



Types of harmful micro-invaders

Protists



CABI Compendium



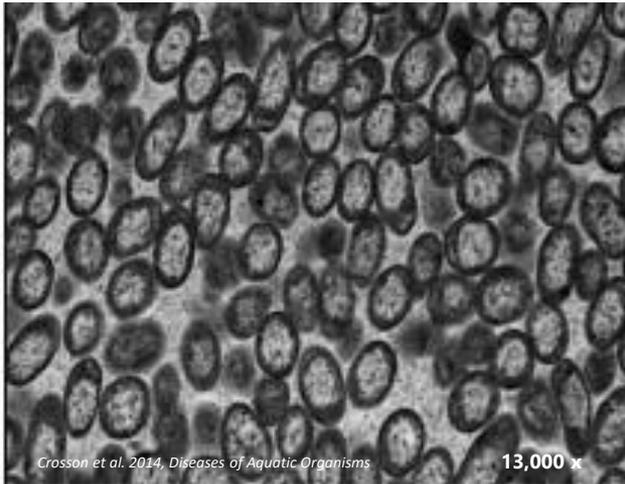
SM, HAVFORSKNINGSINSTITUTTET

Bonamiasis (*Bonamia spp.*)



Types of harmful micro-invaders

Bacteria



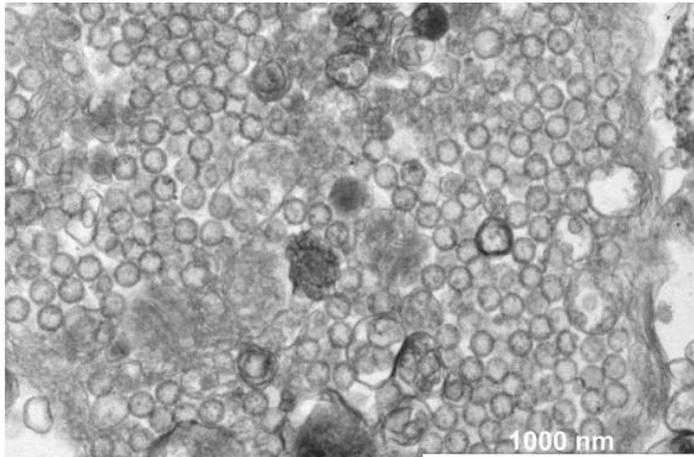
J. Dugan, Hakai Magazine

Abalone Withering Syndrome (*Candidatus Xenohailotis californiensis*)



Types of harmful micro-invaders

Viruses



Colleen Burge, CA Dept of Fish & Wildlife

POMS, Pacific Oyster Mortality Syndrome (*OsHV-1*)



Invasive marine vegetation

Algae



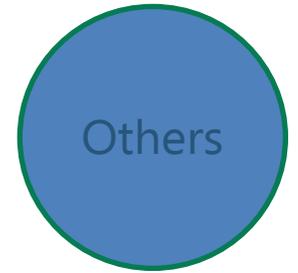
C. King, NOAA MBNMS



B. Paul, Skokomish Tribe



Existing concerns in WA



- Bivalve transmissible cancer (BTN)



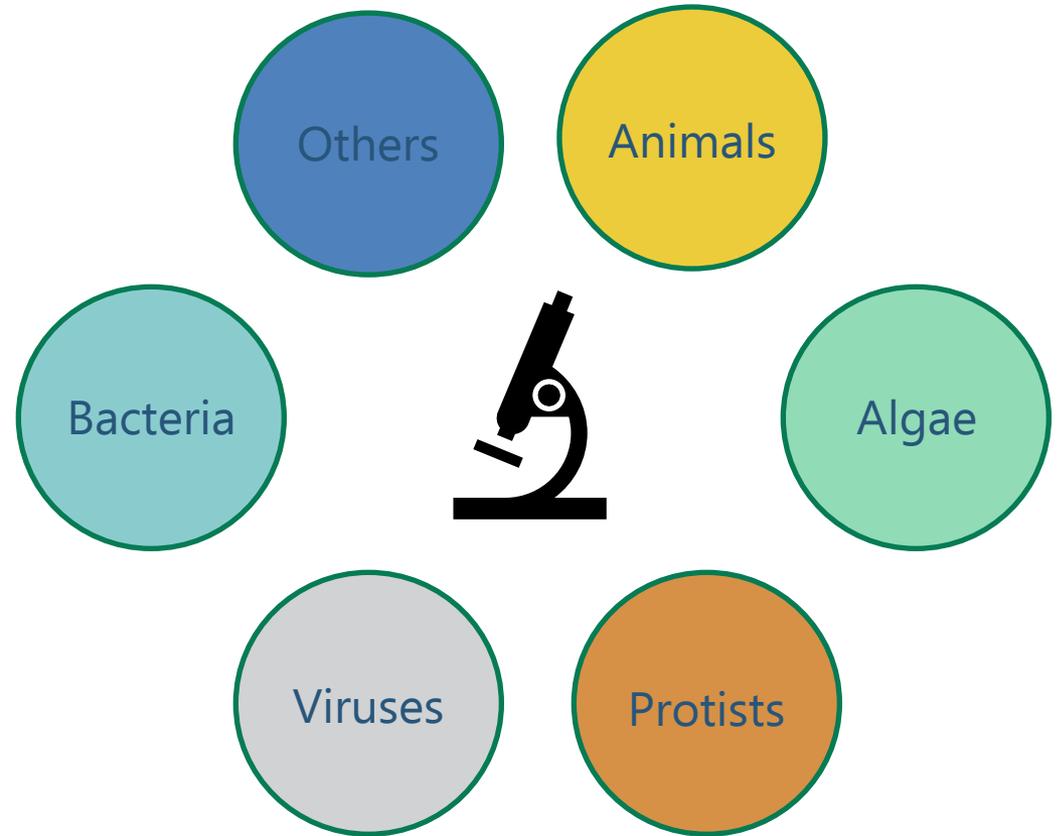
- Sea star wasting disease



© Jan Kocian



Risks + Impacts



Impacts of micro-invaders



Ruby De Luna, KUOW



UW Earth Lab



Impacts of micro-invasaders



D. Rogers, WDFW



B. Paul, Skokomish Tribe



Impacts of micro-invaders

- Kill or harm wild and cultivated shellfish
- Cause economic losses
- Outcompete native microbes
- Change coastal habitats and biodiversity
- Limit recreational opportunities
- Disrupt cultural practices



Micro-invaders

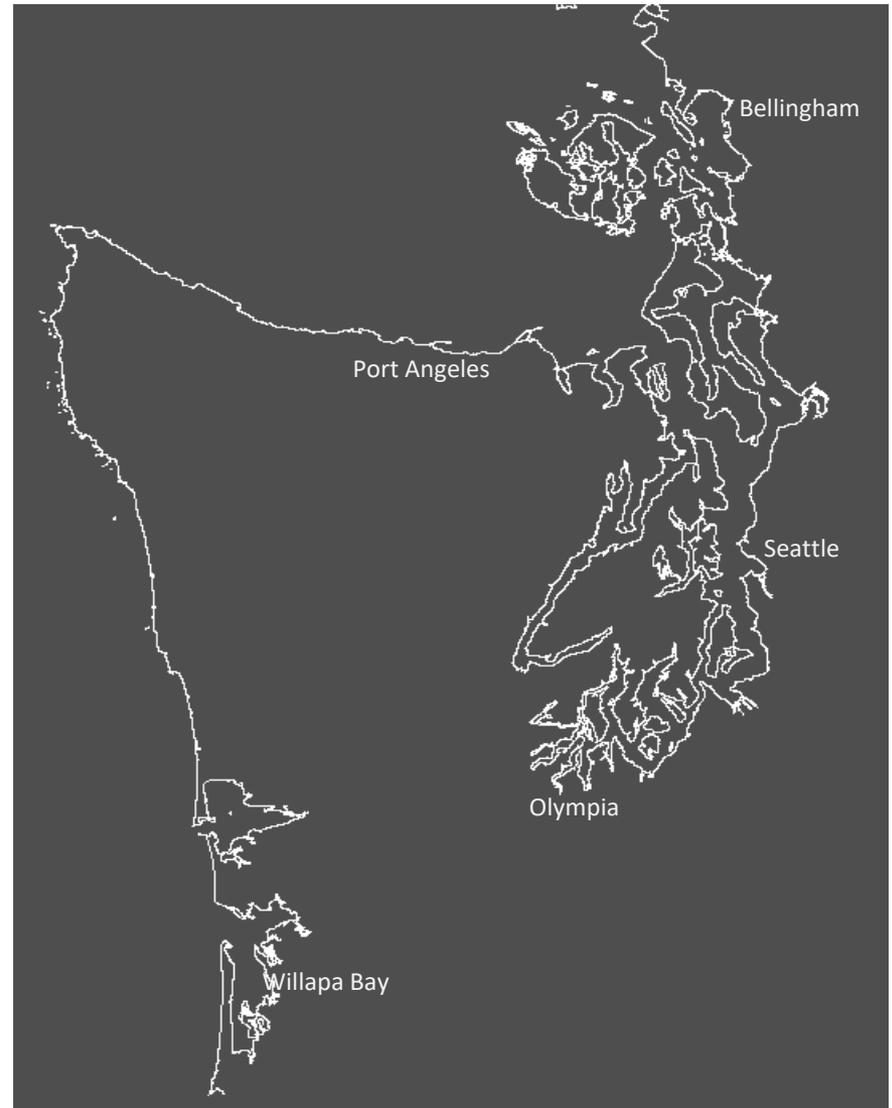
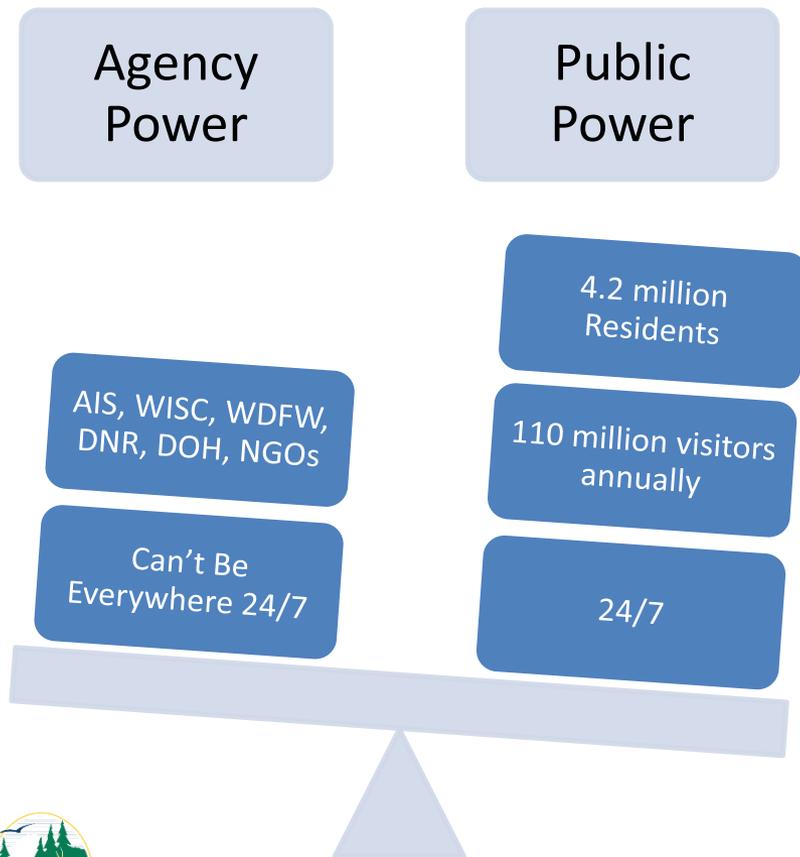




How can the public help? + Simple actions to take

The Scale of Power

Washington has over 3000 miles of coastline (some in remote rural locations)







Keep Market Shells & Market Products out of the water

Benefits

Habitat

Water
Quality



Keep Market Shells & Market Products out of the water

Benefits

Risks

Global Seafood Markets

Habitat

Water
Quality

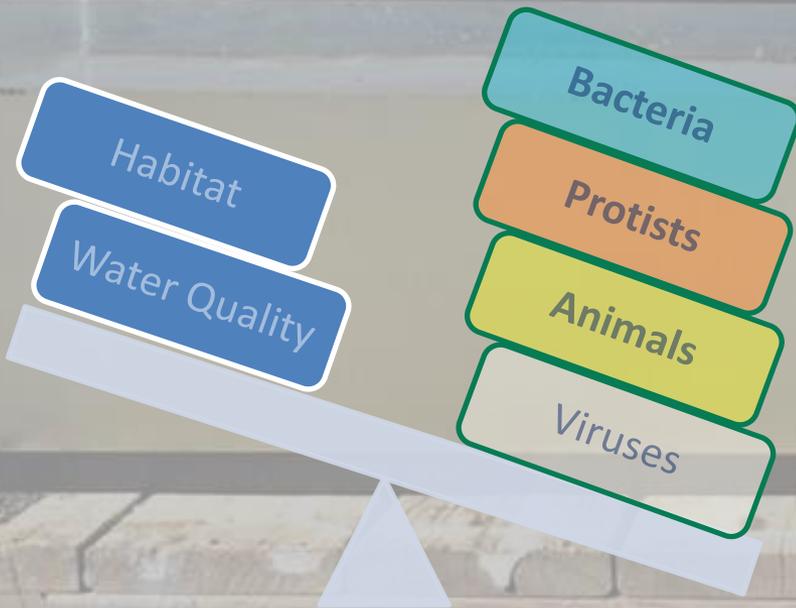


Keep Market Shells & Market Products out of the water

Benefits

Risks

Global Seafood Markets





Keep Market Shells and Market Products out of the water

Do not import Live Shellfish



Ceremonial releases



Seafood discard



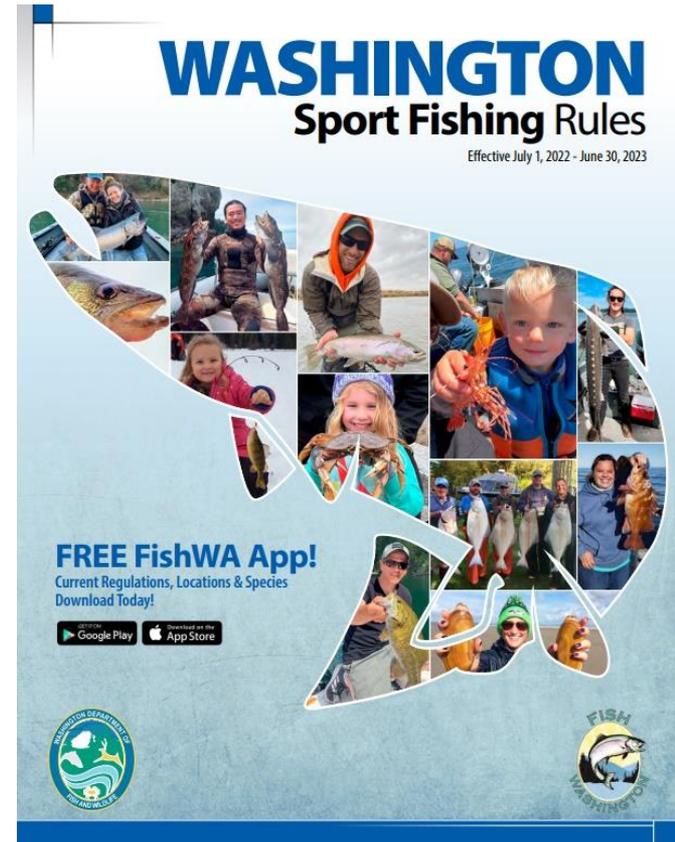
Threats to Shellfish

Do Not Refresh shellfish for BBQs





Abide by recreational harvest rules



OYSTERS

Caution: for Shellfish Safety and Department of Health contact information see page 134. Oysters may only be harvested by hand or with a hand-held manually operated prying tool (no hammers, etc.). Each harvester must use a separate container. Harvesting seasons vary by beach. **See year-round harvest closures and advisories on page 135 and area closures on pages 140-143 Marine Preserves, Conservation Areas, and Shellfish Protection Zones.**

Public Beaches	All Species	See page 132 for season information	Min. size 2½" measured across longest distance of shell. Daily limit 18. Oysters must be shucked on the beach. Oysters consumed on the beach count toward a limit. <u>Leave shells on the same tideland and tide height where they were taken.</u>
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Wash gear/don't move equipment around



Protect Your Waters From Aquatic Invasive Species

BEFORE and AFTER launching boat

CLEAN

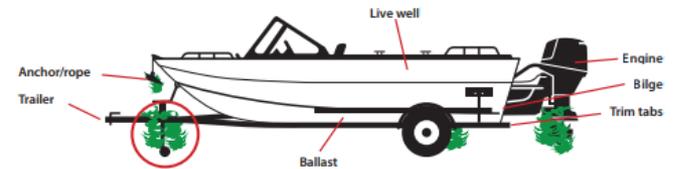
Clean interior/ exterior of boat, trailer, & vehicle of any organic matter such as aquatic plants & mud. Dispose organic matter & unused bait in trash.

DRAIN

Drain bilge, ballast, wells & buckets before you leave area. Keep bilge plug out during transport.

DRY

Dry equipment before launching watercraft into another body of water.



For information on FREE boat inspections, call 1-888-WDFW-AIS (933-9247) or visit wdfw.wa.gov/ais.

Before you launch a boat that is not registered in Washington, you MUST purchase an Aquatic Invasive Species Prevention Permit.

How to buy:

- Online at fishhunt.dfw.wa.gov
- Find a license dealer near you at wdfw.wa.gov/licenses/dealers

Funds from permit sales supports efforts to keep Washington's waters free of aquatic invasive species and manage infestations when prevention fails.

Avoid Citations or Fines

Failure to possess an Aquatic Invasive Species Prevention Permit – Infraction — RCW 77.135.160

Possession of aquatic conveyance not meeting clean drain requirements – Infraction — RCW 77.135.110

Introduction or possession of prohibited species – up to class C felony — RCW 77.135.160 (4)





For recreational growers

- Use a WDFW approved seed provider

Check out our website for approved seed providers!

Company	Facility name	Facility location	Approved species and life stage	Approval expires	Permitting type
Taylor Shellfish	Dabob Bay Hatchery	Dabob Bay, Hood Canal	Seed and larvae: PO; Seed: MC, MM, GK, OO, KO, EO*	12/31/23	Transfer, commercial and non-commercial; *EO not for general distribution
Taylor Shellfish	Oakland Bay FLUPSYS Burley Lagoon FLUPS	Oakland Bay, South Sound Burley Lagoon, South Sound	Seed/juveniles: PO, MM, MC, OO, KO, EO*	12/31/23	Transfer, commercial and non-commercial; *EO not for general distribution
Taylor Shellfish	Totten Inlet nursery	Totten Inlet, South Sound	GK, seed/juveniles	12/31/23	
Taylor Shellfish	Upland setting tanks, Willapa	Bay Center, Willapa Bay	PO, seed on cultch	12/31/23	Transfer, commercial
Puget Sound Restoration Fund	Ken K. Chew Center	Manchester, Central Sound	Native shellfish species for restoration;	12/31/23	Transfer, restoration
Skagit Bay Shellfish Co.	Skagit Bay FLUPSY	Swinomish Channel	Seed: OO; PO; KO	12/31/23	Transfer, commercial
Olympia Oyster Seed Project	Budd Inlet tidelands	Budd Inlet, South Sound	Seed: OO; PO	12/31/23	Transfer, non-commercial only
Jamestown Point Whitney Ventures	Point Whitney Hatchery	Point Whitney, Hood Canal	Seed: PO, KO, GK	12/31/23	Transfer, commercial
Jamestown Point Whitney Ventures	Sequim Bay FLUPSY	Sequim Bay	Seed: PO, KO	12/31/23	Transfer, commercial
National Fish and Oyster Co.	Grapeview FLUPSY	Grapeview	Seed: PO, MC	12/31/23	Transfer, commercial
Rock Point Oyster Co.	Remote setting and FLUPSY facilities, Tarboo Bay; Seed on cultch, Hood Canal	Tarboo Bay, Hood Canal; Hood Canal	Seed: PO	12/31/23	Transfer, commercial
Willapa Bay Oyster Co.	Upland nursery, Willapa Bay	Cedar River, Willapa Bay	Seed/juveniles: PO, OO, KO, MC	12/31/23	Transfer, commercial
Hama Hama Co.	Oakland Bay FLUPSY	Oakland Bay, South Sound	Seed: PO, KO, OO, MC	12/31/23	Transfer, commercial
Calm Cove Shellfish	Oakland Bay FLUPSY	Oakland Bay, South Sound	Seed: PO, MC	12/31/23	Transfer, commercial
Chelsea Farms	Oakland Bay FLUPSY	Oakland Bay, South Sound	Seed: PO, MC, OO, KO	12/31/23	Transfer, commercial



Lots of information on our website

The screenshot shows the Washington Department of Fish and Wildlife website. At the top left is the logo with the text "Washington Department of Fish and Wildlife". To the right are links for "Select Language", "Translation limitations and disclaimer", "About WDFW", "Newsroom", "Get involved", and "Civil Rights/Accessibility". A search bar is located below these links. The main navigation menu includes "Home", "Species & Habitats", "Fishing & Shellfishing", "Hunting", "Licenses & Permits" (highlighted), and "Places to go".

The breadcrumb trail reads: [Licenses & Permits](#) / [Fishing and shellfishing licenses](#) / [Shellfish, aquatic invertebrate, and seaweed health and cultivation permitting information](#)

Licenses & Permits

- Fishing and shellfishing licenses**
- Hunting licenses
- Construction and environmental permits
- Parking and access passes
- License plates
- License dealers
- Commercial licensing
- Roadkill salvage permit

Shellfish, aquatic invertebrate, and seaweed health and cultivation permitting information

ATTENTION: Shellfish transfer permit applicants wishing to transfer shellstock from areas of known or suspected European green crab presence to areas considered free of green crab should expect permit condition requirements designed to reduce risk of transfer of green crab. As of 2022, this now includes Hood Canal. Permit conditions generally consist of various extra washing and containment procedures, but may include others depending on the proposed transfer. A map can be found under "More information" below.

Shellfish Import and Transfer permitting requirements are intended to reduce risk associated with introducing and spreading shellfish disease agents and harmful aquatic pest organisms. As specified in WACs [220-340-050](#) and [220-340-150](#), it is unlawful to import from out of state or transfer shellfish within Washington State without first obtaining a Washington state Shellfish Import or Shellfish Transfer Permit. Once a person submits a complete shellfish import or shellfish transfer permit application, unless further information is required from the applicant, the department will submit transfer and import permit applications to a required 20 working day tribal review, prior to being issued. "Shellfish" are defined as all non-insect aquatic invertebrates.

The importation of kelp and other [marine plants](#) also requires an [Import Permit](#). There are some restrictions on the transfer of marine plants within the state (see below).

Cultivation of aquatic products: The cultivation of any aquatic products, including shellfish and seaweed, [requires an Aquatic Farm Registration](#). Registration information can be found via [WDFW Licensing](#). Aquatic Farmers must also [maintain and report](#) farm production records to WDFW Licensing. [Production reports must contain the information described here](#) and more information can be found in [WAC Chapter 220-370](#).

Commercial harvest of intertidal wildstock clams and oysters from non-state lands

Never relocate shells or shellfish without a permit from WDFW.



<https://wdfw.wa.gov/licenses/fishing/shellfish-import-transfer#moreinformation>



Questions?

**AN OUNCE OF PREVENTION
IS WORTH A POUND OF CURE.**

- BENJAMIN FRANKLIN

